20210-060601

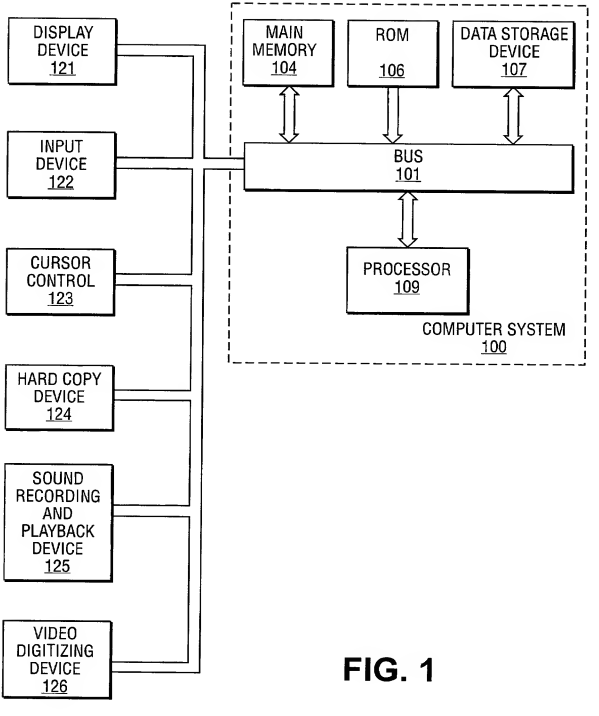
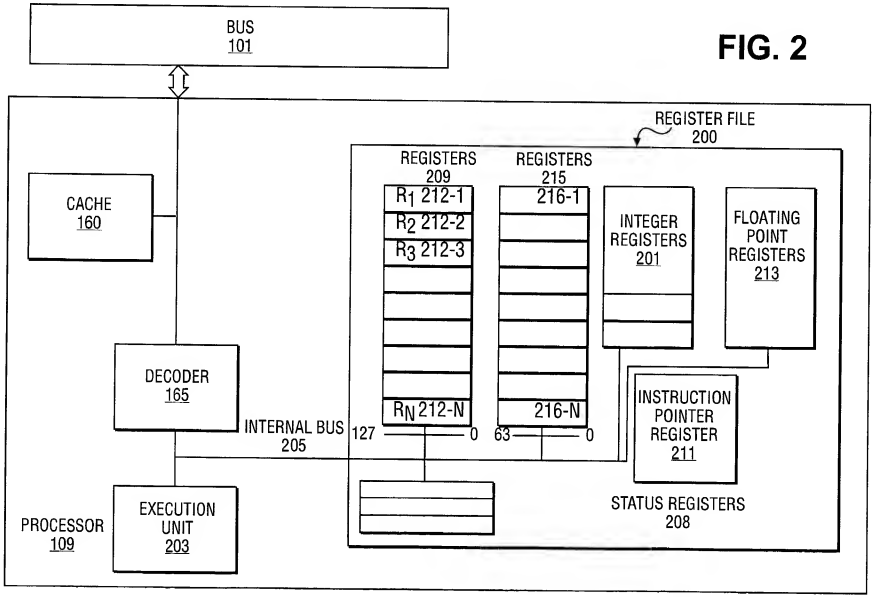


FIG. 1

FIG. 2


BUS
101
REGISTER FILE
200
REGISTERS
209
REGISTERS
215
CACHE
160
R1 212-1
R2 212-2
R3 212-3
RN 212-N
216-1
216-N
INTEGER
REGISTERS
201
FLOATING
POINT
REGISTERS
213
DECODER
165
INTERNAL BUS
205
127
0
63
0
INSTRUCTION
POINTER
REGISTER
211
STATUS REGISTERS
208
PROCESSOR
109
EXECUTION
UNIT
203

20020156951

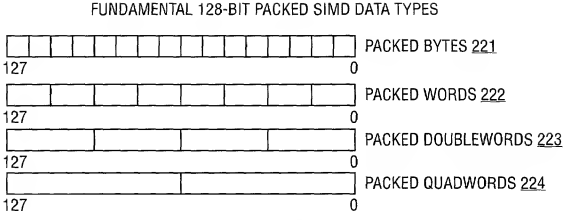


FIG. 3A

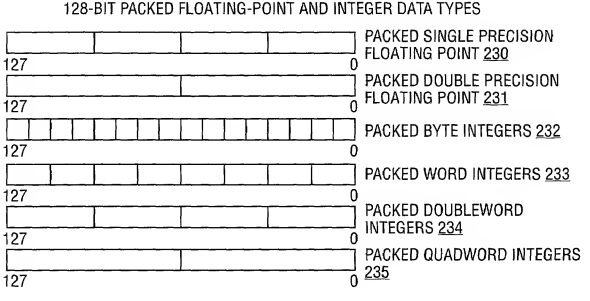


FIG. 3B

20020095.0207

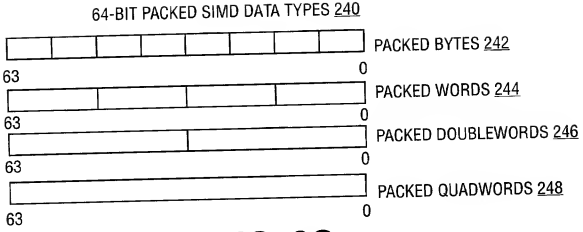


FIG. 3C

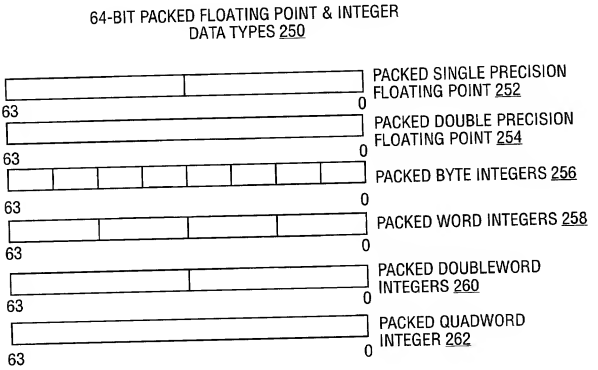


FIG. 3D

$$S=\begin{bmatrix} S_{11} & S_{12} & S_{13} & S_{14} \\ S_{21} & S_{22} & S_{23} & S_{24} \\ S_{31} & S_{32} & S_{33} & S_{34} \\ S_{41} & S_{42} & S_{43} & S_{44} \end{bmatrix} = \left[\begin{array}{c|c} A & B \\ \hline C & D \end{array}\right]$$

SOURCE MATRIX 300

FIG. 4A MATRIX SUBDIVISION

$$A=\begin{bmatrix} S_{11} & S_{12} \\ S_{21} & S_{22} \end{bmatrix} = \begin{bmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{bmatrix} \qquad B=\begin{bmatrix} S_{13} & S_{14} \\ S_{23} & S_{24} \end{bmatrix} = \begin{bmatrix} B_{11} & B_{12} \\ B_{21} & B_{22} \end{bmatrix}$$

SUB-MATRIX A - 310 SUB-MATRIX C - 320

$$C=\begin{bmatrix} S_{31} & S_{32} \\ S_{41} & S_{42} \end{bmatrix} = \begin{bmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{bmatrix} \qquad D=\begin{bmatrix} S_{33} & S_{34} \\ S_{43} & S_{44} \end{bmatrix} = \begin{bmatrix} D_{11} & D_{12} \\ D_{21} & D_{22} \end{bmatrix}$$

SUB-MATRIX C - 330 SUB-MATRIX D - 340

FIG. 4B

312 $A.V_1 = [A_{11}, A_{12}]$
314 $A.V_2 = [A_{21}, A_{22}]$
SUB-MATRIX A ROWS

322 $B.V_1 = [B_{11}, B_{12}]$
324 $B.V_2 = [B_{21}, B_{22}]$
SUB-MATRIX B ROWS

332 $C.V_1 = [C_{11}, C_{12}]$
334 $C.V_2 = [C_{21}, C_{22}]$
SUB-MATRIX C ROWS

342 $D.V_1 = [D_{11}, D_{12}]$
344 $D.V_2 = [D_{21}, D_{22}]$
SUB-MATRIX D ROWS

FIG. 4C SUB-MATRIX ROW REPRESENTATION

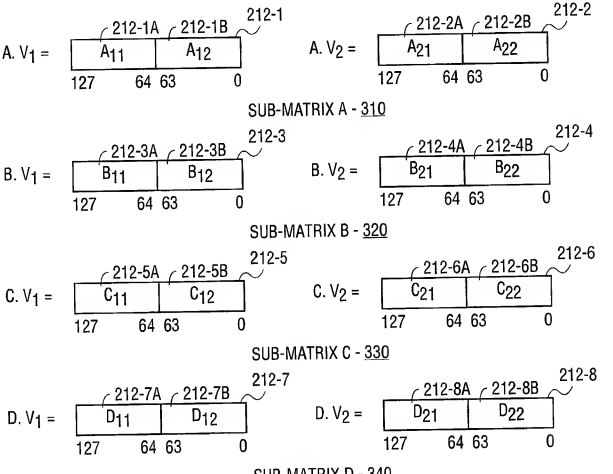

A. V1 =
212-1A
212-1B
212-1
A11
A12
127
64 63
0
A. V2 =
212-2A
212-2B
212-2
A21
A22
127
64 63
0
SUB-MATRIX A - 310
B. V1 =
212-3A
212-3B
212-3
B11
B12
127
64 63
0
B. V2 =
212-4A
212-4B
212-4
B21
B22
127
64 63
0
SUB-MATRIX B - 320
C. V1 =
212-5A
212-5B
212-5
C11
C12
127
64 63
0
C. V2 =
212-6A
212-6B
212-6
C21
C22
127
64 63
0
SUB-MATRIX C - 330
D. V1 =
212-7A
212-7B
212-7
D11
D12
127
64 63
0
D. V2 =
212-8A
212-8B
212-8
D21
D22
127
64 63
0
SUB-MATRIX D - 340
REGISTER REPRESENTATION

FIG. 4D

20070056695

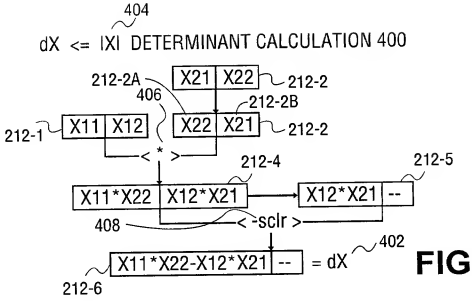


FIG. 5

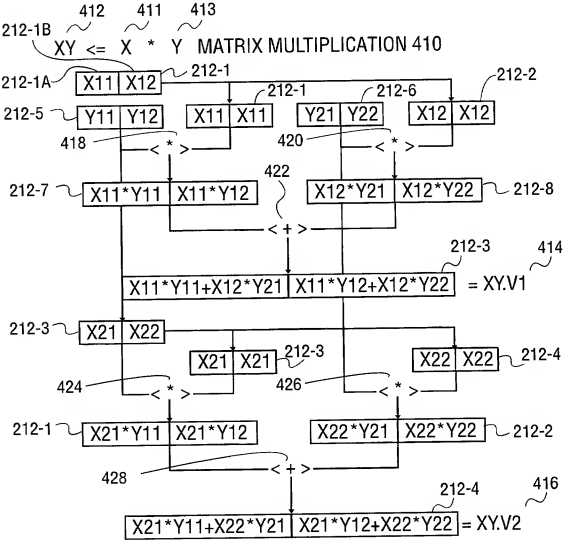


FIG. 6

20070056007

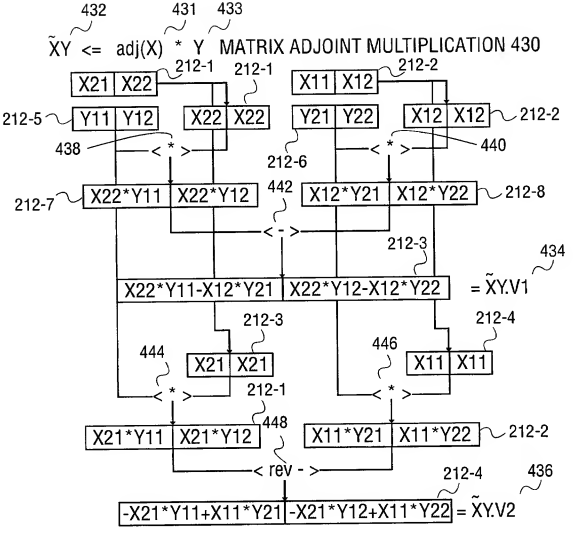


FIG. 7

20070195-010203

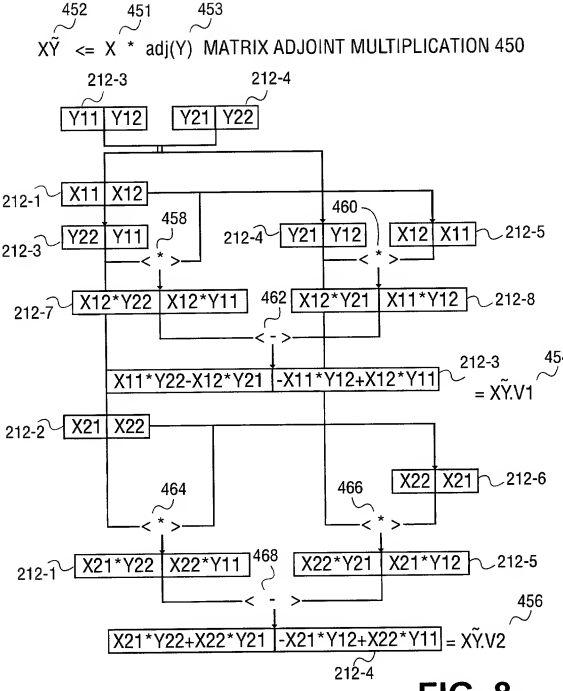


FIG. 8

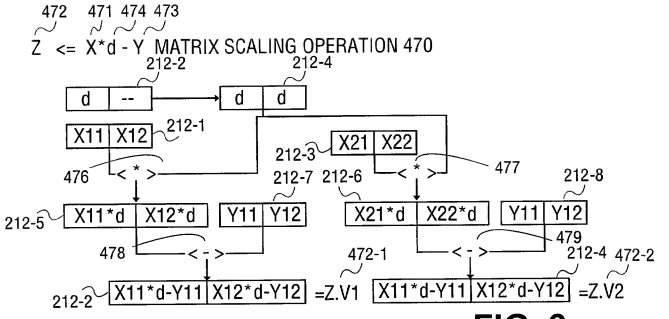

472 471 474 473
Z <= X*d - Y MATRIX SCALING OPERATION 470
212-2
212-4
d -- d d
X11 X12 212-1
212-3 X21 X22
476 < * > 477
212-7 212-6 212-8
212-5 X11*d X12*d Y11 Y12 X21*d X22*d Y11 Y12
479
478 < - > 472-1 < - > 212-4 472-2
212-2 X11*d-Y11 X12*d-Y12 =Z.V1 X11*d-Y11 X12*d-Y12 =Z.V2

FIG. 9

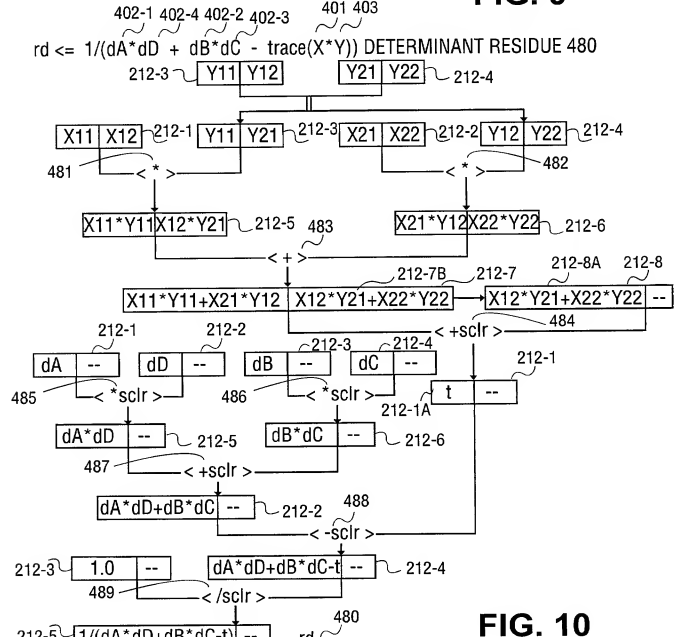

402-1 402-4 402-2 402-3 401 403
rd <= 1/(dA*dD + dB*dC - trace(X*Y)) DETERMINANT RESIDUE 480
212-3 Y11 Y12 Y21 Y22 212-4
X11 X12 212-1 Y11 Y21 212-3 X21 X22 212-2 Y12 Y22 212-4
481 < * > 482 < * >
X11*Y11 X12*Y21 212-5 483 X21*Y12 X22*Y22 212-6
< + >
212-7B 212-7 212-8A 212-8
X11*Y11+X21*Y12 X12*Y21+X22*Y22 X12*Y21+X22*Y22 --
484 < +sclr >
212-1 212-2 212-3 212-4 212-1
dA -- dD -- dB -- dC -- t --
485 < *sclr > 486 < *sclr > 212-1A
dA*dD -- 212-5 dB*dC -- 212-6
487 < +sclr >
dA*dD+dB*dC -- 212-2 488
< -sclr >
212-3 1.0 -- dA*dD+dB*dC-t -- 212-4
489 < /sclr >
212-5 1/(dA*dD+dB*dC-t) -- = rd 480

FIG. 10

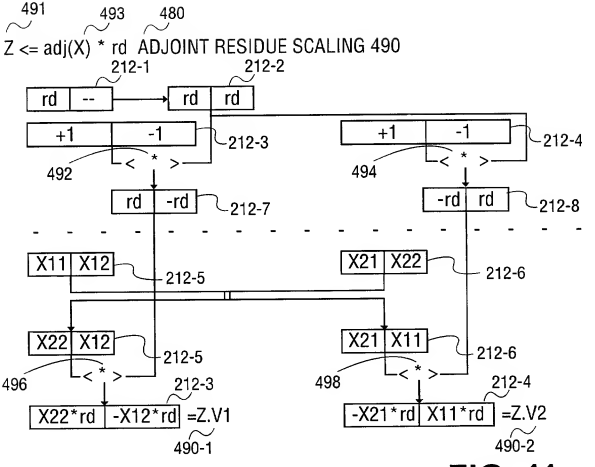


FIG. 11

EP 2 017 756 A1

20020105.0103395

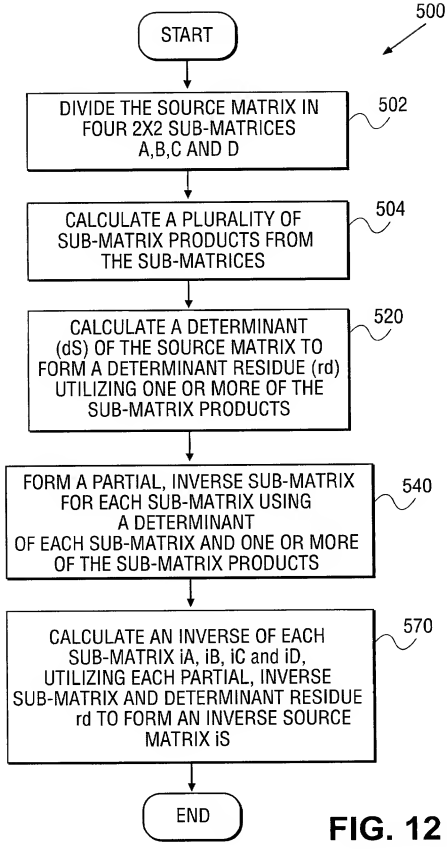


FIG. 12

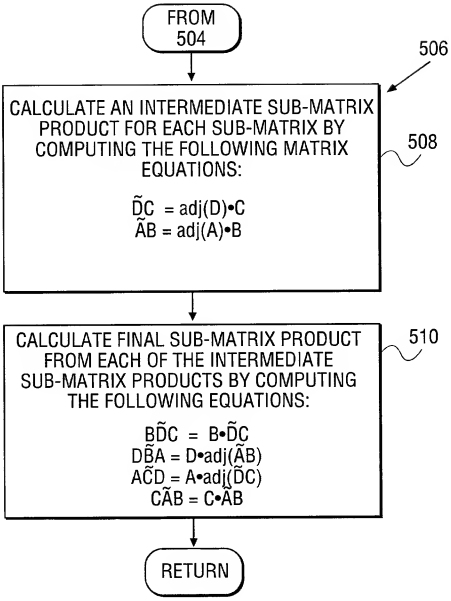

FROM 504
506
CALCULATE AN INTERMEDIATE SUB-MATRIX PRODUCT FOR EACH SUB-MATRIX BY COMPUTING THE FOLLOWING MATRIX EQUATIONS:
$\tilde{D}C = adj(D) \bullet C$
$\tilde{A}B = adj(A) \bullet B$
508
CALCULATE FINAL SUB-MATRIX PRODUCT FROM EACH OF THE INTERMEDIATE SUB-MATRIX PRODUCTS BY COMPUTING THE FOLLOWING EQUATIONS:
$B\tilde{D}C = B \bullet \tilde{D}C$
$D\tilde{B}A = D \bullet adj(\tilde{A}B)$
$A\tilde{C}D = A \bullet adj(\tilde{D}C)$
$C\tilde{A}B = C \bullet \tilde{A}B$
510
RETURN

FIG. 13

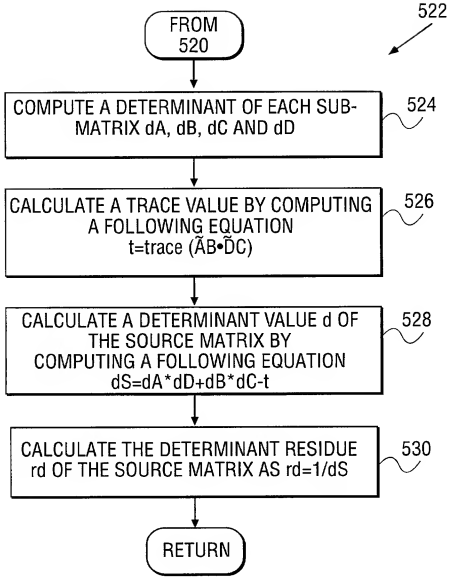


FIG. 14

20070095.0038

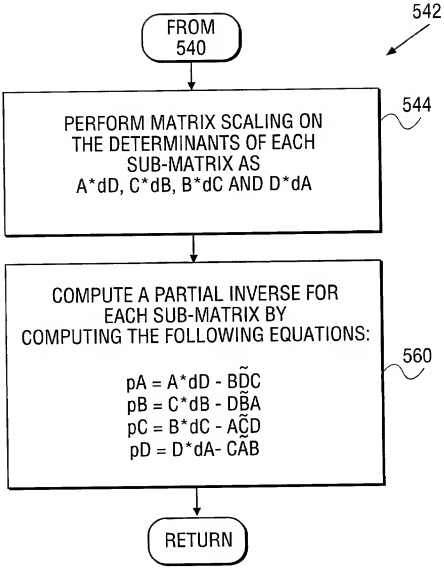

542
FROM 540
PERFORM MATRIX SCALING ON THE DETERMINANTS OF EACH SUB-MATRIX AS A*dD, C*dB, B*dC AND D*dA
544
COMPUTE A PARTIAL INVERSE FOR EACH SUB-MATRIX BY COMPUTING THE FOLLOWING EQUATIONS:
pA = A*dD - BD̃C
pB = C*dB - DB̃A
pC = B*dC - AC̃D
pD = D*dA- CÃB
560
RETURN

FIG. 15

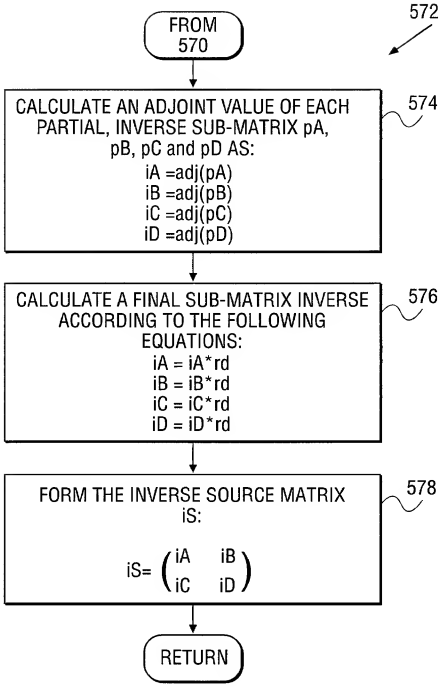


FIG. 16

20201095.1023.1003.1

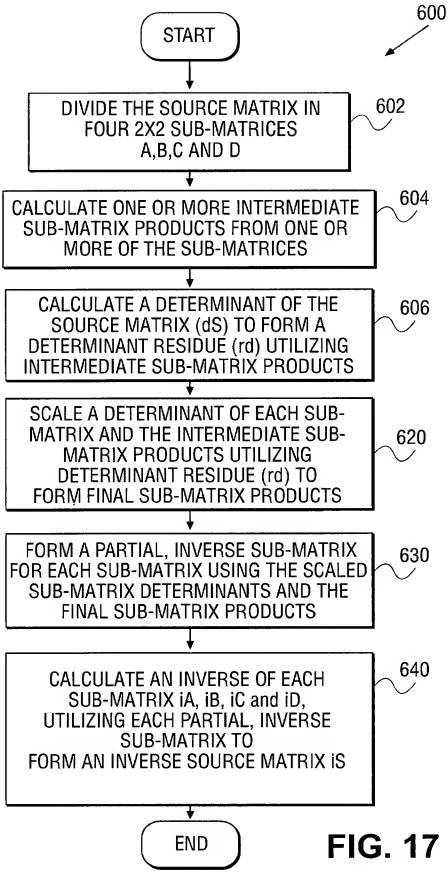


FIG. 17

20070056301

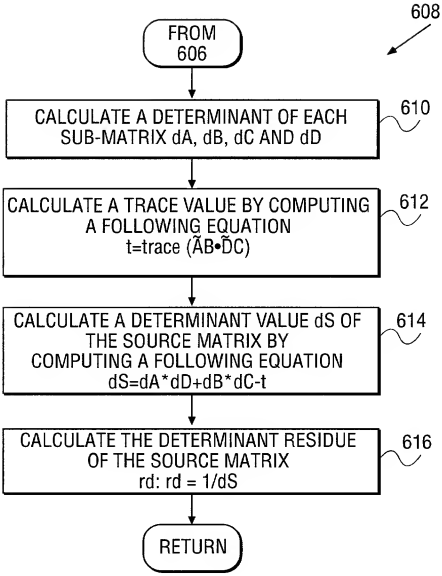

608
FROM 606
CALCULATE A DETERMINANT OF EACH SUB-MATRIX dA, dB, dC AND dD
610
CALCULATE A TRACE VALUE BY COMPUTING A FOLLOWING EQUATION t=trace (ÃB•D̃C)
612
CALCULATE A DETERMINANT VALUE dS OF THE SOURCE MATRIX BY COMPUTING A FOLLOWING EQUATION dS=dA*dD+dB*dC-t
614
CALCULATE THE DETERMINANT RESIDUE OF THE SOURCE MATRIX rd: rd = 1/dS
616
RETURN

FIG. 18

20070195.102301

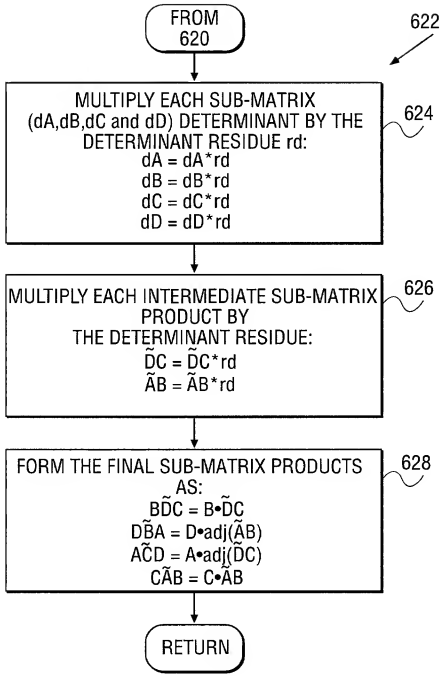


FIG. 19

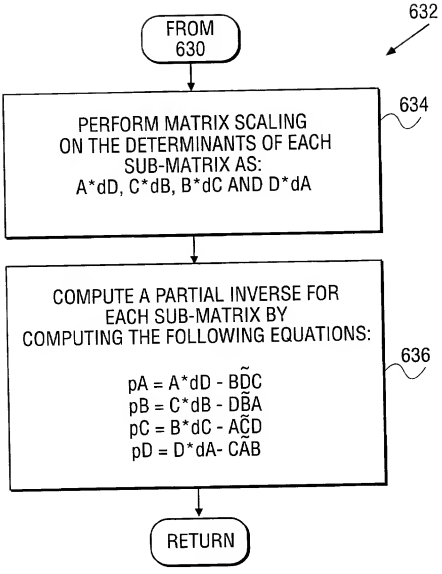

632
FROM 630
PERFORM MATRIX SCALING ON THE DETERMINANTS OF EACH SUB-MATRIX AS: A*dD, C*dB, B*dC AND D*dA
634
COMPUTE A PARTIAL INVERSE FOR EACH SUB-MATRIX BY COMPUTING THE FOLLOWING EQUATIONS:
pA = A*dD - BD̃C
pB = C*dB - DB̃A
pC = B*dC - AC̃D
pD = D*dA- CÃB
636
RETURN

FIG. 20

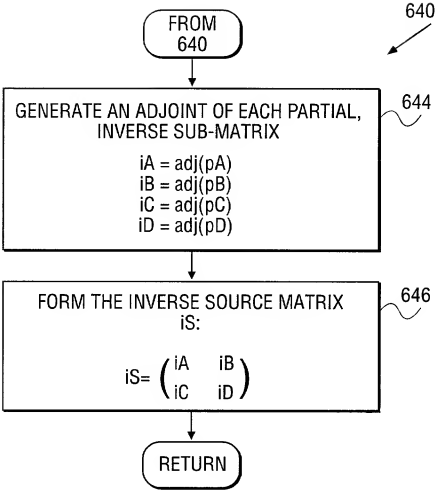

640
FROM 640
GENERATE AN ADJOINT OF EACH PARTIAL, INVERSE SUB-MATRIX
644
iA = adj(pA)
iB = adj(pB)
iC = adj(pC)
iD = adj(pD)
FORM THE INVERSE SOURCE MATRIX iS:
646
iS= (iA iB / iC iD)
RETURN

FIG. 21